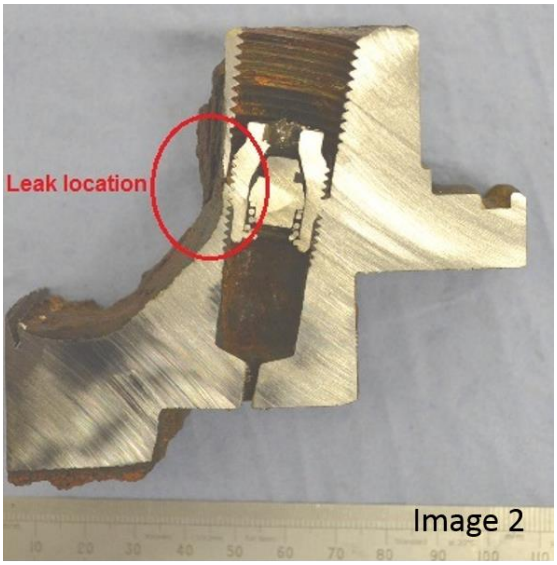
SAFETY ALERT

Gas leak from a manual ball valve (adjacent to a grease injection channel)



Description of Process:

The failure occurred on a valve which was located in a line downstream of a low pressure gas compressor. The valve was an isolation point for a blow down valve (which is installed further downstream of the failed valve). The failed valve was a manual isolation valve: 6" NB, class 300, full bore, manufactured in ASTM A350 LF2. The valve had been in service for approximately 20 years.

Description of Incident:

During normal operations, a gas leak was detected and traced to the failed valve. The plant was shut down and the valve was removed for further investigation.

The investigation revealed that a leak had occurred on the flange adapter (see Image 2). The leak site was adjacent to a grease injection channel drilled into the flange adapter. The investigation revealed that the grease injection channel was drilled at an angle to the flange adapter, and not orthogonal as shown in the original general arrangement drawing for the valve.

It was confirmed that the angled drilling was as per original supplier design, and the original wall thickness at the location of the leak was estimated (by the operator) as 1.5-2.0 mm only. The wall loss from the valve, due

to external corrosion, was estimated at 0.5-1.0 mm overall. The angled grease channel was confirmed to be standard detail for full bore valves up to 12".

A review was carried out on the remainder of the valves on the plant. As a precaution, a further 6 valves were removed and replaced but showed no deterioration. The orientation of the grease injection channels was orthogonal (right angle) to the flange adapter.

It was identified during the investigation that this arrangement presents an inherent area of low wall thickness on the valve (by design). This threat had not been identified in the maintenance or inspection programme.

During this investigation, it was confirmed that this design arrangement was still in supply by the original equipment supplier at the time of this investigation.

Image 1

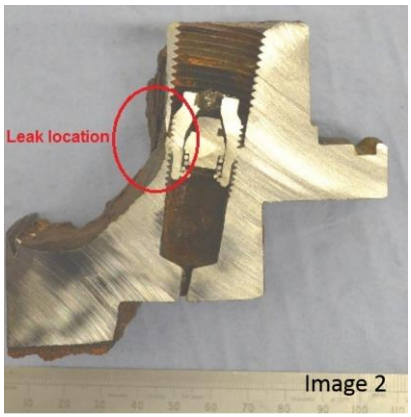


Image 2

Image Details:

Image 1. the failed valve during onshore hydraulic test, to show the leak location.

Image 2: a section cut through the valve at the leak location, showing the orientation of the grease channel and the low wall thickness of the flange adapter local to the grease channel. Note that the grease injector shown in Image 1 has been removed in this photo.

Good Practice Guidance:

It is recommended that this alert is used to review inspection and fabric maintenance procedures for valves, highlighting the possible risk of areas of low wall thickness by design and therefore potential additional hazards during mechanical preparation for painting.